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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Downstream prediction using a nonlinear prediction method" *by* N. H. Adenan and M. S. M. Noorani

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We are very grateful for the helpful, suggestion and useful information made by the reviewer in order to improving the writing of this manuscript.

Referee comment: 1. The determination of the preliminary parameter pair (τ, m) plays a significant role in forecasting performance of nonlinear prediction method.

Author comment: The objective of this research is clearly about prediction of river flow. We purpose that all the involved time series data should be used in the reconstruction of the phase space. So, the entire data will be involved when the time delay is employed in reconstruction of the phase space. Although the reconstruction phase space will overlap if is used, we tolerate having some information redundancy in preference to

losing any useful information as has been emphasized in the report of the several studies (Wang, Gelder, Vrijling, & Ma, 2006; Wang, 2006; Wu, Chau, & Li, 2009). Based on previous studies on the river flow prediction showed that when a condition of time delay is used in phase space reconstruction, the results gave good predictions (Sivakumar, 2002, 2003).

Referee comment: 2 and 3. correlation dimension method and the false nearest neighbor technique

Author comment: Purpose of using correlation dimension method and the false nearest neighbors technique is to estimate the embedding dimension for prediction purposes. Hence, we used which involved entire data to estimate the embedding dimension by using both method. Model I used for which m is the result of the calculation of the correlation dimension, while Model II used for which m is the result of FNN calculation. Using these methods, the optimal combination for Model I was (1,6) and for Model II it was (1, 14). The overall prediction results showed that both models could give a good prediction for the river flow downstream.

Referee comment: 4. Another important parameter in the nonlinear prediction method is the number of nearest neighbors. In the study, there is not any explanation about how and how many nearest neighbors are selected?

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Assume that the reconstruction of phase space is like . The k-nearest neighbors for is required to predict . According (Casdagli, 1992), the number k is small. In this study, the value of k in this study is chosen as k = 2m where m is the embedding dimension (Theiler, Eubank, Alamos, Trail, & Fe, 1993). Assume that the vector of the minimum distance to the nearest neighbor is Next, for the local linear approximation method, the values of and are used to satisfy the linear equations The constants A and B are calculated using the least squares method. Thus, the predictive value can be calculated using

Referee comment: 5. The authors argued that both methods gave a good prediction performance for the river flow downstream. However, the obtained correlation coefficients for Model I and Model II are 0.6103 and 0.6360 which are essentially Rsquare=0.372 and Rsquare=0.404, respectively. I think these Rsquare values are rather poor and it is evident that there is no reason to use these models in downstream prediction.

Author comment: From the presented measured and predicted river flow plots it can be seen that the results for high flows are accurate which would be relevant for flood risk management applications. Hence, based on that reason, this models still can be used in downstream prediction for flood risk management applications.

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